SCL Laser Wire Progress Report

AP Talk

January-28-2003

MEBT Test

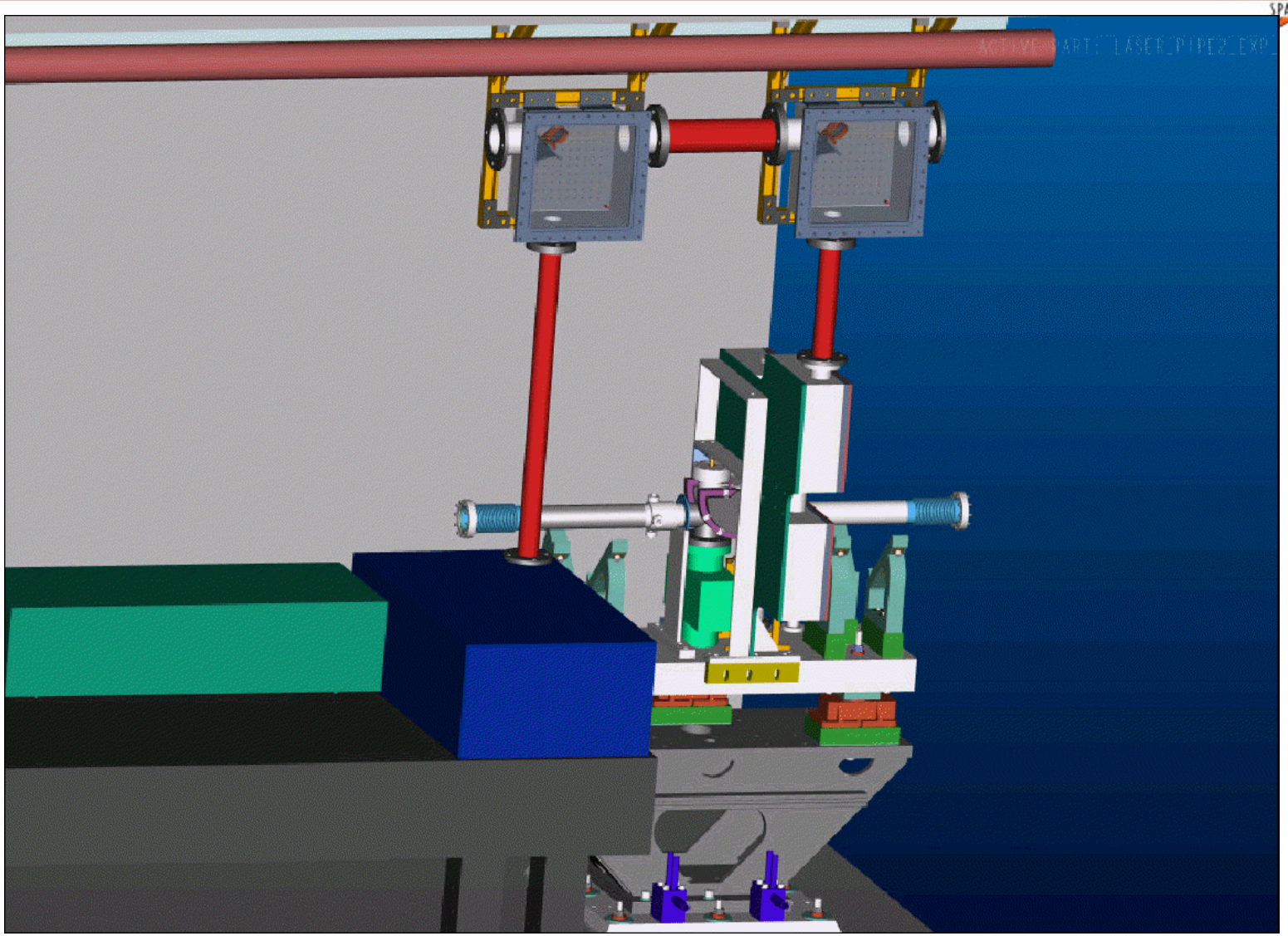
- So far .75 million pulses on Beam

2) Profile measurements from MEBT

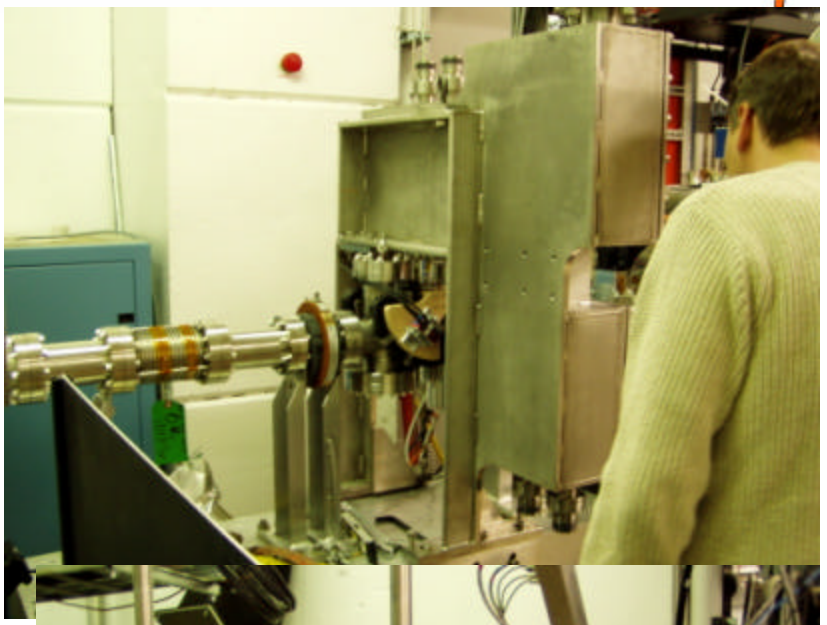
3) We hope to make Beam in Gap Measurement

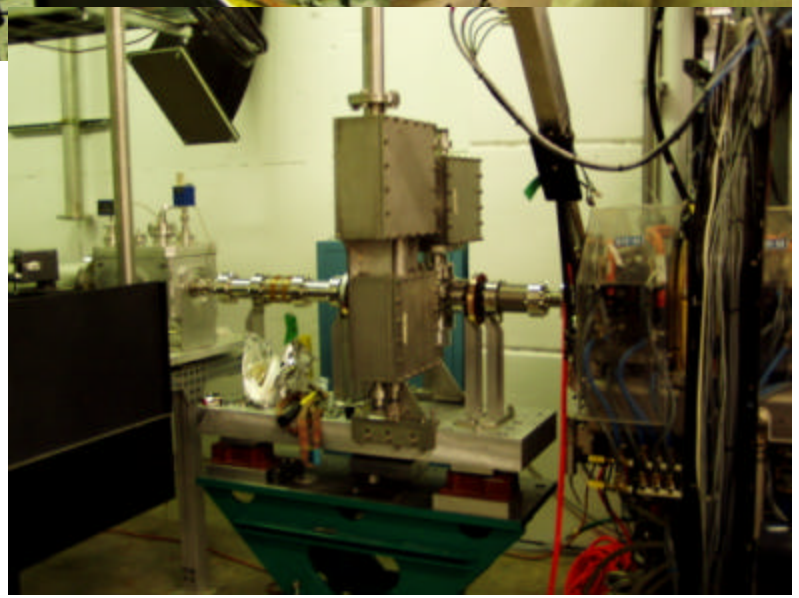
4) What's Next (Schedule)

SCL Laser-Wire Setup Design for MEBT Test

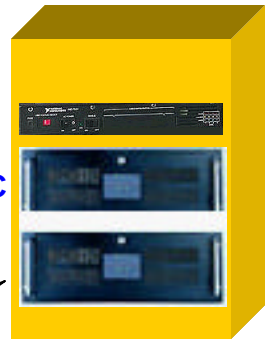


SCL Laser-Wire Setup Implementation





MEBT Laser Wire Control Overview

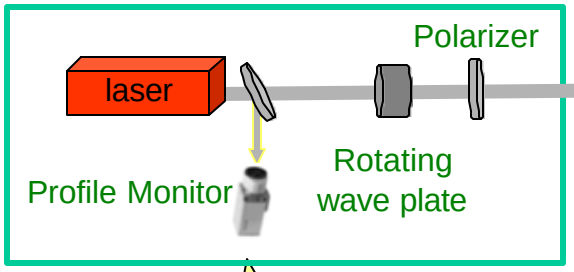


Motor Drive

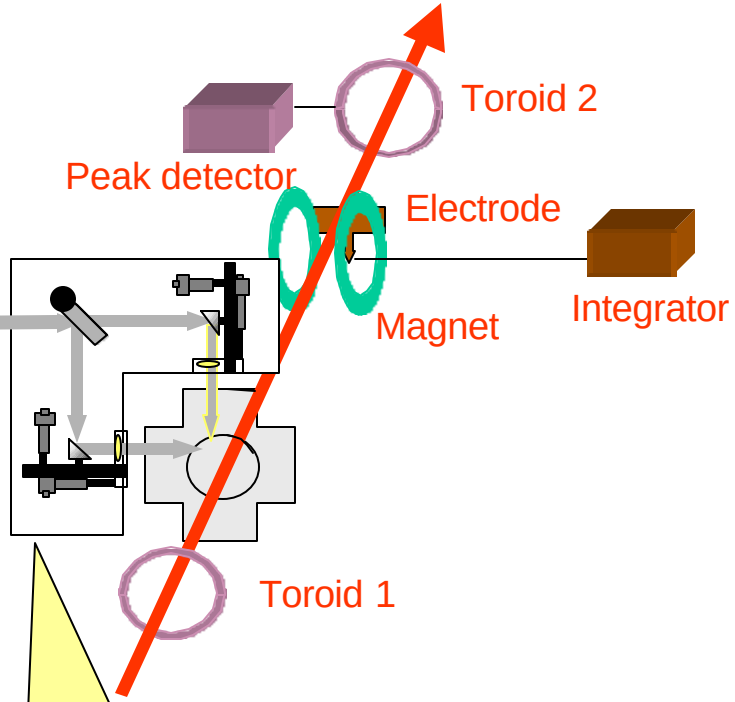
Beam box PC

Laser PC

Rack
- Beam box PC
  - DAQ
  - Motion
- Laser PC
  - Vision
  - DAQ
  - RS232
- Motor Drive

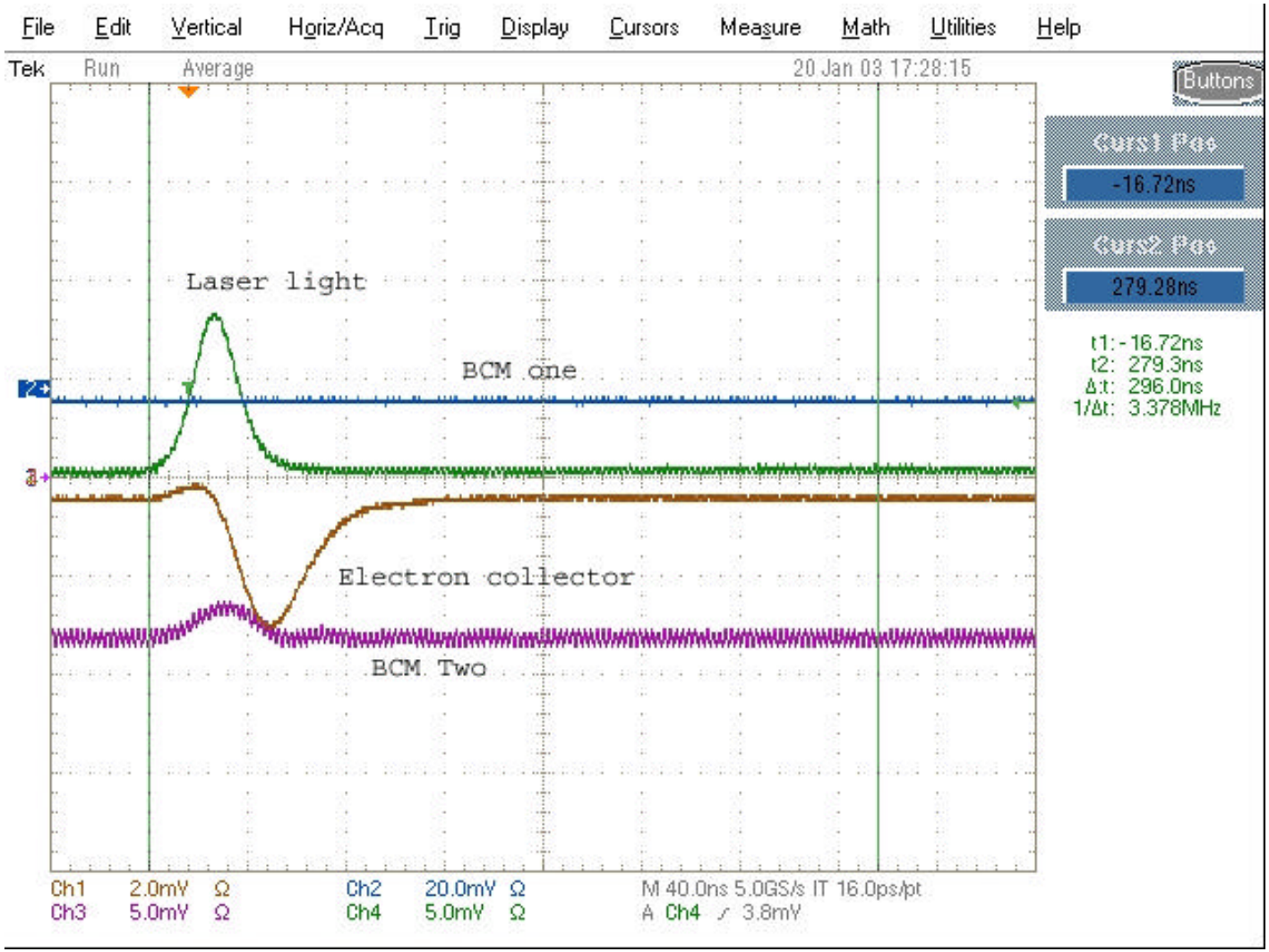


Optical Table
- Laser profile
- Laser attenuation

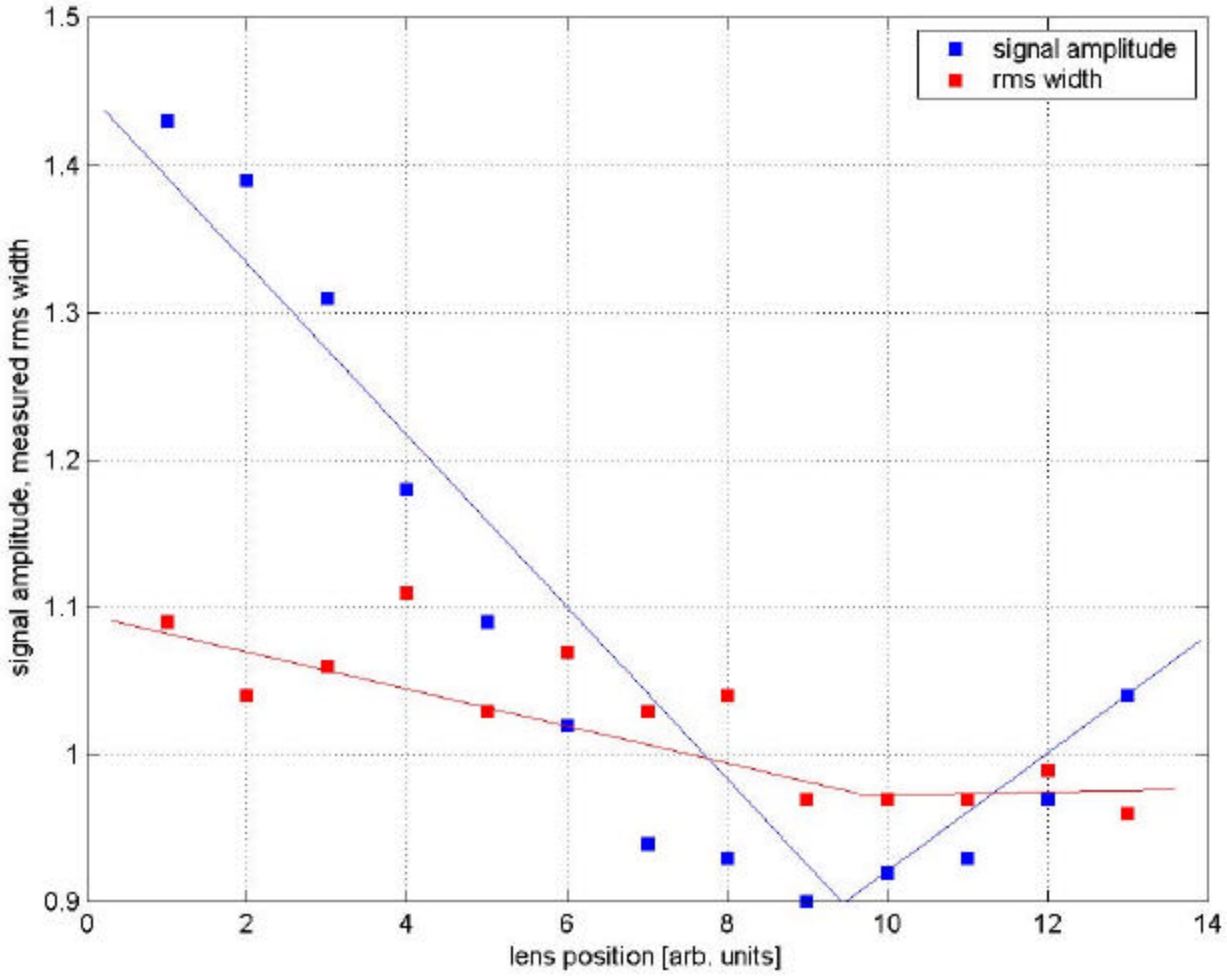


Beam Box Mount
- Scan actuator
- Lens actuator
- Mirror flipper

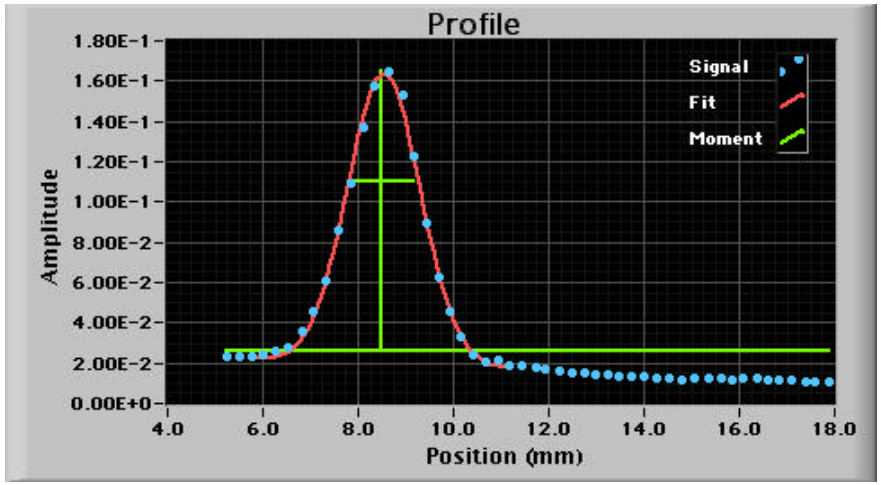
Comparison of the Beam Current monitor and the Electron Collector

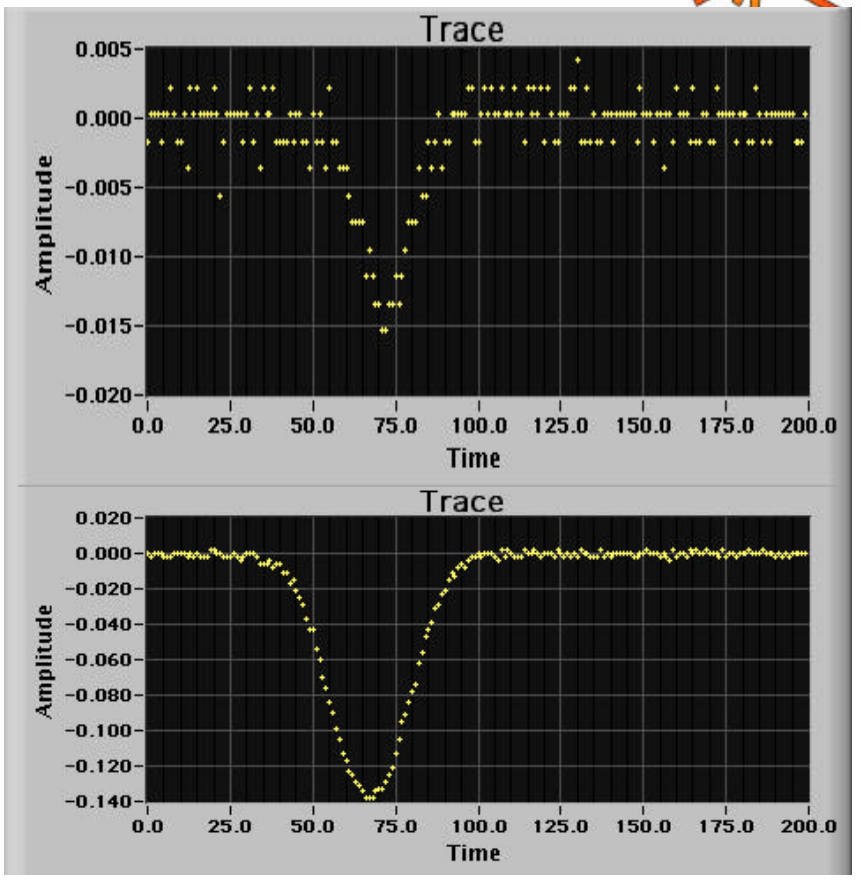


Optimization of laser beam size



MEBT Horizontal transverse profile



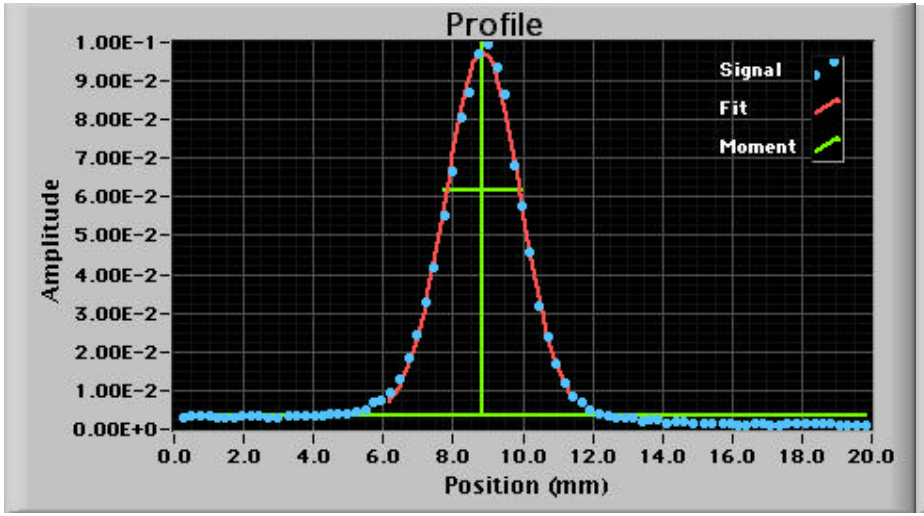


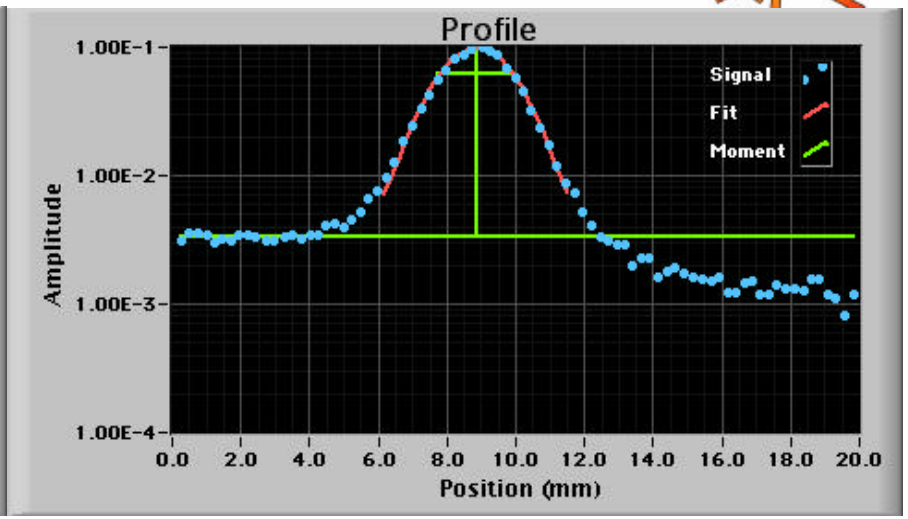
Fit Results

Ampl	0.14
Mean	8.56
Sigma	0.76
Offset	0.03
Slope	-0.00
Area	0.27

[scan 142] using the laser-wire. The left plot shows the fit to a profile, the top right shows the trace still showing a notch at the edges, the bottom right shows the notch when the laser hits the middles of the beam. The fits are plotted out to 3.5 * sigma and take the offset and possible slope in background into account. The electrode was not biased.

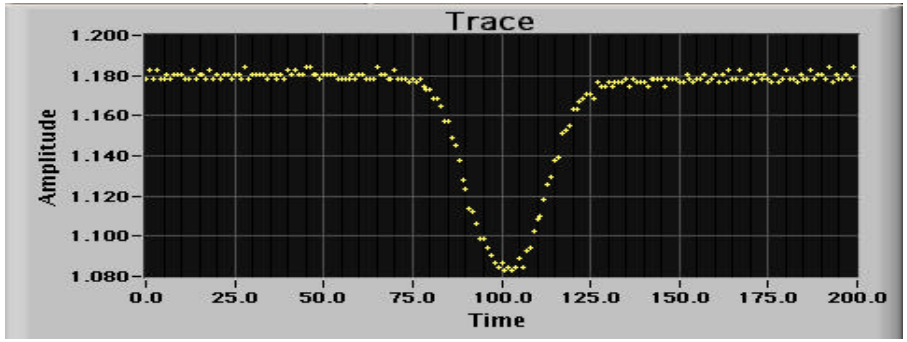
MEBT Horizontal Transverse Profile





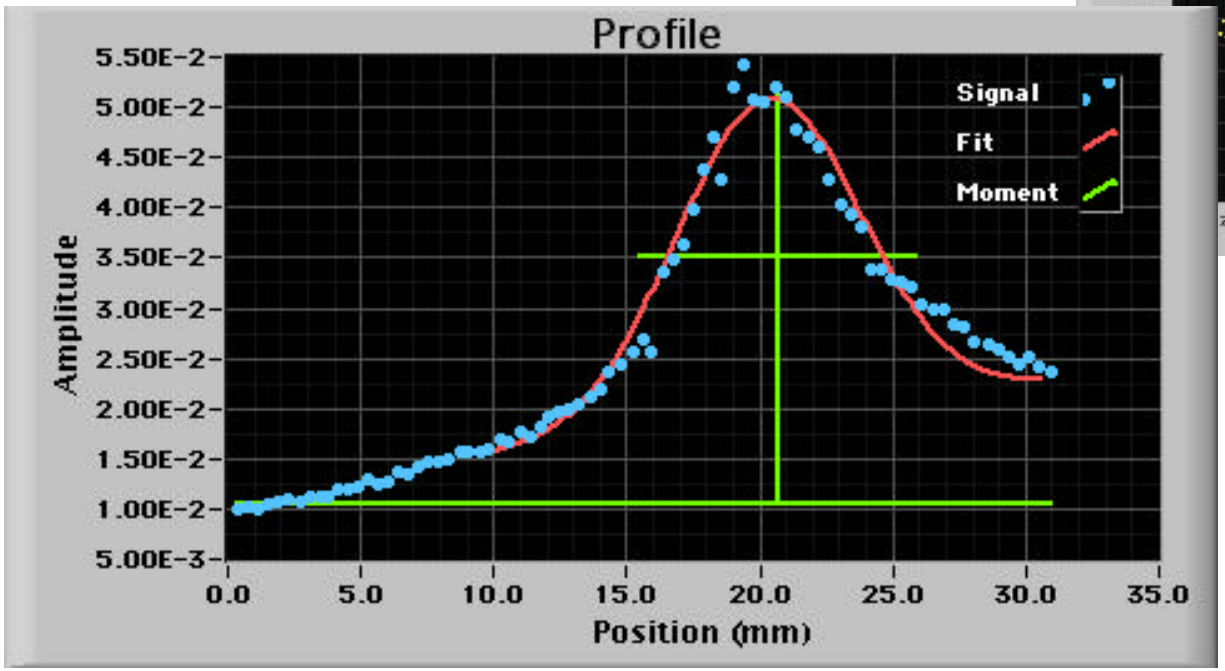
Fit Results

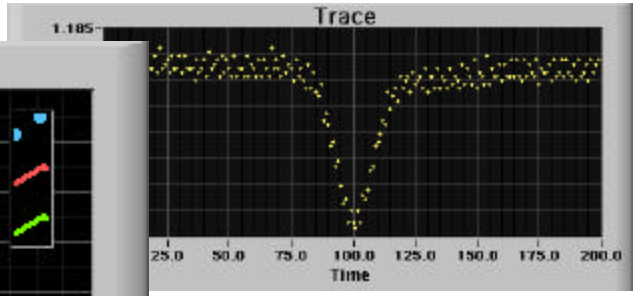
Ampl	0.09
Mean	8.88
Sigma	1.07
Offset	0.00
Slope	-0.00
Area	0.25



[scan 219] using the laser-wire. The left plot shows the fit to a profile, the right shows the logarithmic plot, the bottom shows a single trace of the electrode. The fits are plotted out to 2.5 * sigma. The electrode has a bias of about 10 Volts.

MEBT Vertical Transverse Profile



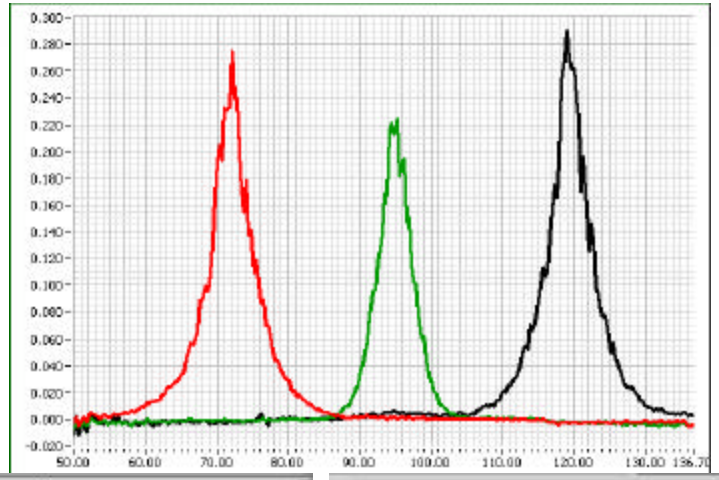


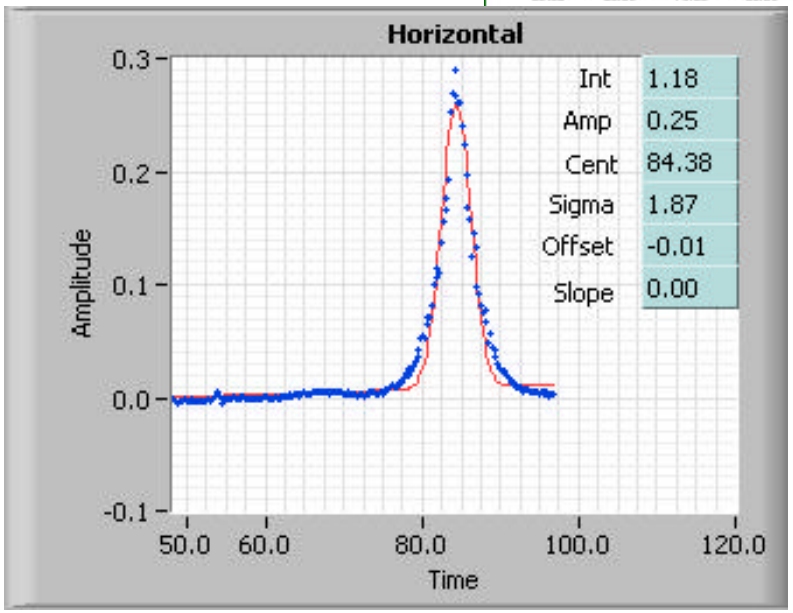
Fit Results

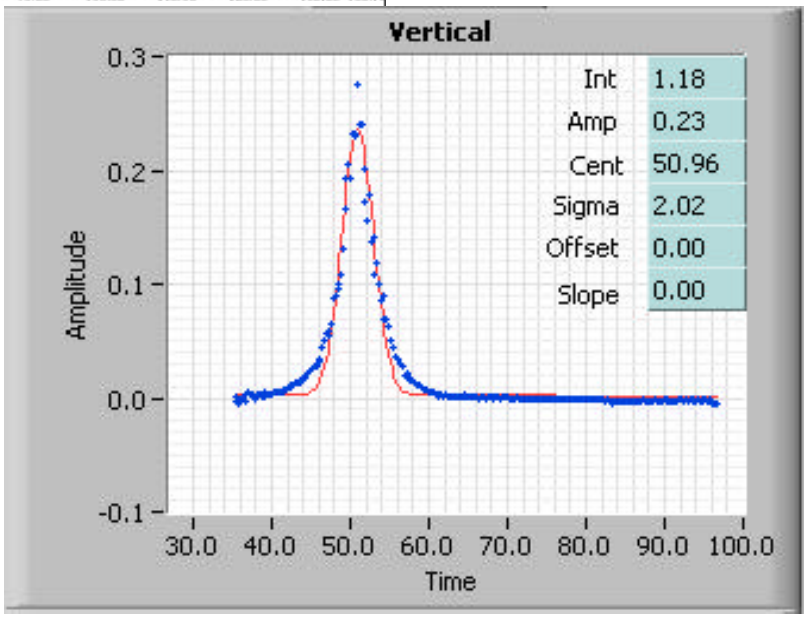
Ampl	0.03
Mean	20.36
Sigma	3.44
Offset	0.01
Slope	0.00
Area	0.27

[scan 208] using the laser-wire. The left plot shows the fit to a profile with significant tails on both sides of the beam, the right shows the trace when the laser hits the middles of the beam. The fits are plotted out to 3.0 * sigma and take the offset and possible slope in background into account. The electrode was biased.

Carbon Wire in the MEBT

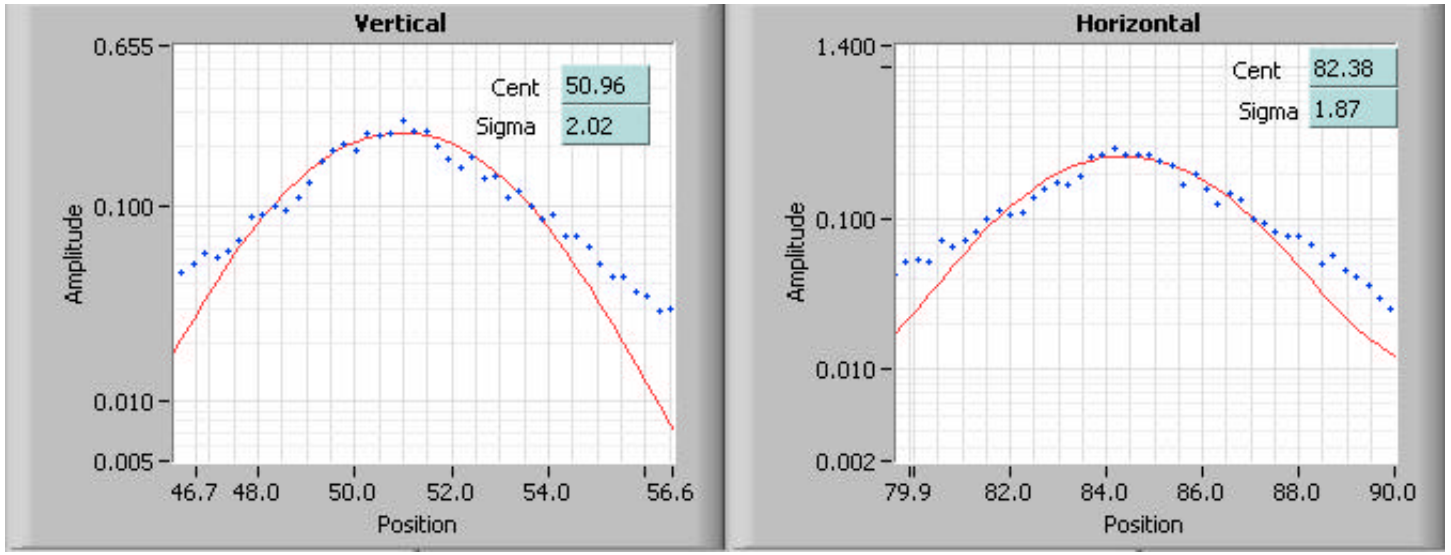






MEBT horizontal and vertical profiles from wire scanner WS14. It shows the tails to the beam distributions as well.

Carbon Wire in the MEBT

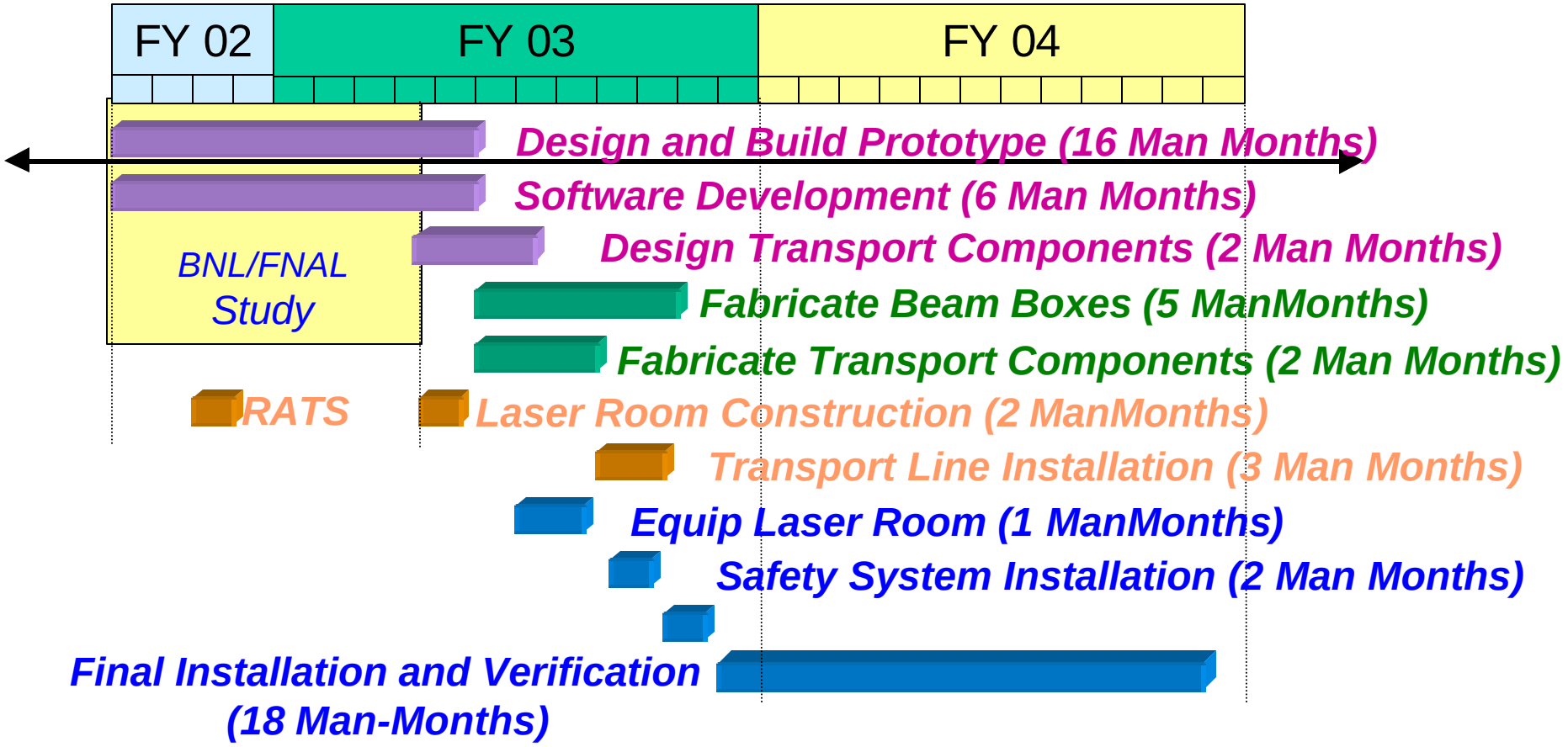


MEBT horizontal and vertical logarithmic profiles from wire scanner WS14.

ORNL Laser Wire Design Team:

Alignment: Joe Error
Data acquisition and analysis: Wim Blokland, Matthew Stedinger
Electron Collector: Craig Deibele
Electronics: Jim Pogge
Mechanical Design Team: Graeme Murdoc, Dan Stout, Arnold DeCarlo , James Kelly, Kerry Potter
Mechanical Design Advisory Team: Peter Ladd, Mike Hechler, Paul Gibson.
Magnet design: Ted Hunter
Optics: Warren Grice
Physics: Sasha Aleksandrov
Project Lead: Saeed Assadi

Schedule



Total Effort: 4.9 Man-Years